REMARKS

The Applicants respectfully request reconsideration of this application and the entry of the claim amendments set forth above under the provisions of Section 116. Certain of the claims have been amended as set forth above and claims 1-5, 7, 9-12, 14-20, 22, 24-26, 28 and 30-34 remain in the application for reconsideration by the Examiner. The Examiner's allowance of all pending claims is earnestly solicited.

The rejection of claims 1-5, 7-12, 14-18, 22-24, 28 and 31-34 under Section 112, second paragraph (related to the use of the words "steps" and "step") are overcome by the proposed amendments to the various ones of the rejected claims (and to independent claim 19) as set forth above.

Claim 23 stands rejected under Section 112, second paragraph as indefinite. Claims 23 and 8 have been cancelled without prejudice. The cancellation of these claim is not to be interpreted as an admission of the validity of the rejection.

Claims 1-2, 5, 7-12, 14-20, 22-26, 28 and 30-34 under Section 103 as unpatentable over Catalano (4,485,043) in combination with Fujisaki (US 2004/0043570 A1). Claims 3 and 4 stand rejected Catalano in combination with Fujisaki and further in view of Raaijmakers (6,492,218) and Yates (6,3550,322).

To further distinguish the invention over the cited art, the Applicants propose to amend claim 1 as set forth above in the marked-up version of the claim. Support for these changes can be found in the application in paragraphs [0026] through [0031].

Both Catalano and Fujisaki relate to contaminant removal, and the Examiner therefore suggests that the references are combinable according to the accepted principles of combining references. But the analysis of the propriety of the combination does not end with the recognition that both relate to contaminant removal.

Catalano discloses forming a p-type layer for his photovoltaic device by depositing material from a doped deposition gaseous mixture comprising, for example, boron. See column 4, lines 45 and 46. Catalano desires to reduce the level of dopant contaminants that remain in the chamber following the doped deposition step, including residual contaminant boron on chamber walls, to avoid contamination of an intrinsic amorphous silicon layer that is to remain in an undoped condition, during a subsequent deposition process. Thus Catalano discloses removing

the residual boron by reaction with an oxidizer such as nitrogen trifluoride. Products of the reaction are gases that can be pumped from the chamber. See Catalano column 2, lines 10-24. See also column 3, lines17-24 where Catalano discloses, "depositing a first doped layer comprising silicon . . . and forming gaseous residual contamination comprising the unreacted first doping gas and its reaction products; contacting said gaseous residual contamination [boron] in the chamber with a decontamination gas capable of reacting with the residual contamination and substantially removing the residual contamination from the chamber." At column 5, lines 1-3 Catalano discusses flushing the chamber with a decontaminating gas for substantially removing residual p-type doping contaminants in a gaseous state.

Fujisaki desires to use a silicon-nitride film as the gate insulator of a MOSFET, but recognizes that silicon nitride has a relatively poor heat resistance due to the inclusion of hydrogen in the film. See paragraph [0012]. When the film is heated to temperatures above about 550° C carrier traps are formed that degrade performance of the MOSFET. By reducing the amount of hydrogen in the film, heat treatment at temperatures above 550° C can be successfully performed without the generation of carrier traps. As Fujisaki explains at paragraph [0045], "Native oxide produced at the surface of the Si substrate is removed by hydrofluoric acid (HF) and at the same time, dangling bonds appearing at the Si surface are subjected to hydrogen termination. Thereby, the Si substrate can be prevented from being reoxidized. When the Si substrate subjected to the hydrogen termination is heated, at 560 degree C or higher, hydrogen atoms at the surface are evaporated and the silicon nitride film which does not include Si--H bonds is formed." As he explains at paragraph [0061], substrate temperature is returned to 360° C and nitriding the substrate for 15 minutes and thereafter annealing the substrate at 900° C for 60 minutes in pure nitrogen. A film having excellent characteristics is produced notwithstanding the treatment at 900° C.

The basis for combining these two references is not clear and does not appear to satisfy the prima facie test for reference combinations. There is no relationship between the hydrogen bake and deposition temperature of Fujisaki, for which the Examiner relies on this reference, to the Catalano process of removing boron residual contaminant in a chamber. The only common element of the various processes in the two references is their use in the fabrication of semiconductor devices. One cannot combine process parameters from one process step (removing contaminants) with those of a different process (forming a silicon nitride gate film for

a MOSFET). As anyone in the semiconductor fabrication business can attest, the recipes (e.g., time, temperature, input gases) for these processes are not easily developed and must be individually and independently tailored.

Further, even if the combination is permitted, it does not disclose the Applicant's invention as set forth in independent claim 1. The Applicants claim formation of the hydrogen terminations on the surface, thereby eliminating consideration of the Fujisaki reference whose principle objective is to reduce the hydrogen content in the silicon nitride gate film and therefore discloses evaporating the hydrogen from the silicon surface to break the hydrogen termination bonds (see Fujisaki Figure 5). Caralano's concern is residual gaseous products in the chamber and on the chamber walls remaining from a prior doping step. As claimed, the Applicants expose the surface where the hydrogen bonds are present to a nitrogen-containing gas to remove contaminants from that surface. Also, the Applicants claim a deposition step performed in the same deposition chamber as the step of exposing the surface to the nitrogen containing gas. Thus it is respectfully submitted that the proposed amendments to claim 1 render it allowable over the art of record.

It is respectfully submitted that each of the dependent claims 2-5, 7, 9-12 and 14-18 depending from amended independent claim 1 includes one or more elements that further distinguish. It is proposed to amend certain of these claims to comport with the proposed amendments to claim 1.

It is proposed to amend rejected independent claim 19 as indicated above. The arguments and remarks set forth above with respect to the rejection of claim 1 apply to the rejection of claim 19. Simply stated, the combination of the cited art does not disclose the steps of process claim 19 as set forth above.

Each of the dependent claims 20, 22, 24-26, 28, 30-34 depending from independent claim 19 includes one or more elements that further distinguish. It is proposed to amend certain of these claims to comport with the proposed amendments to claim 19.

Since the Applicants believe that the proposed amendments overcome the current claim rejections, entry of the amendments under Section 116 and allowance of the pending claims are respectfully requested.

If a telephone conference will assist in clarifying or expediting this Proposed Amendment or the claim changes made herein, the Examiner is invited to contact the undersigned at the telephone number below.

Respectfully submitted,

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